2000 Epidemiological Report on Tuberculosis

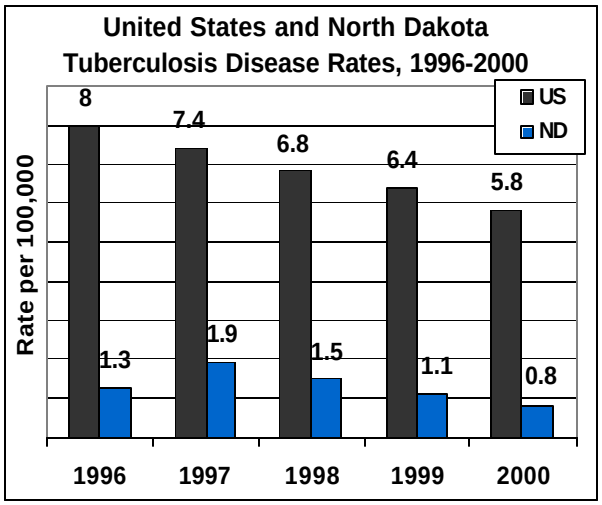
North Dakota Department of Health
Division of Disease Control

TB in North Dakota

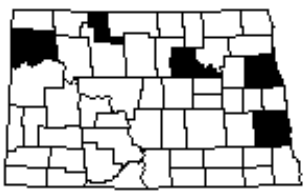
TB in North Dakota - 2000

North Dakota had five cases of tuberculosis (TB) disease reported in 2000. With an incidence rate of 0.8 per 100,000, North Dakota continues to be well below the national rate (Figure 1).

Figure 1



TB was reported in five of North Dakota's 53 counties. As shown in the map below, one case was reported in each of the following counties: Benson , Cass, Grand Forks, Renville and Williams.



Two cases were pulmonary and three were extra-pulmonary. Two involved the cervical lymph nodes and one involved the renal system.

The ages of the TB cases ranged from 13 to 85, with a mean and median age of 56 and 68 respectively. Three cases were white, one was black and one was Native American.

Risk factors associated with TB disease in 2000 included being foreign-born and belonging to a high-risk racial/ethnic group.

No TB-related deaths were reported in 2000.

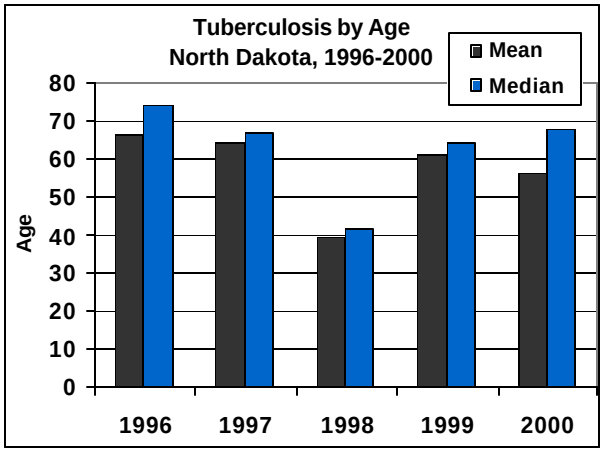
A Five-Year Overview of TB in North Dakota

North Dakota has a low-incidence of TB disease, making it difficult to determine disease trends based on annual data. TB trends can be identified more easily if data from a five-year period is analyzed.

During the past five years, 42 cases of TB disease have been reported in North Dakota (Jan. 1, 1996, through Dec. 31, 2000). The number of annual TB cases ranged from five to 12, resulting in an incidence rate of between 0.8 and 1.9 per 100,000.

Of the 42 cases, 30 were pulmonary (72%), 11 were extra-pulmonary (26%) and one was pulmonary/extra-pulmonary (2%). Fifty-two percent of the TB cases were age 60 or older. The mean and median ages of TB cases over the past five years were 57 (range = 39 to 66) and 63 (range = 42 to 74) respectively. (Figure 2)

Figure 2



As shown in Figure 2, the mean and median ages in 1998 were significantly lower than in other years. This is due to the diagnosis of disease in three children, all younger than age 10.

Risk factors associated with TB disease were multiple, although an increase in the state's racial/ethnic populations over the years accounts for the increased number of TB cases reported in these racial/ethnic groups. (Table 1)

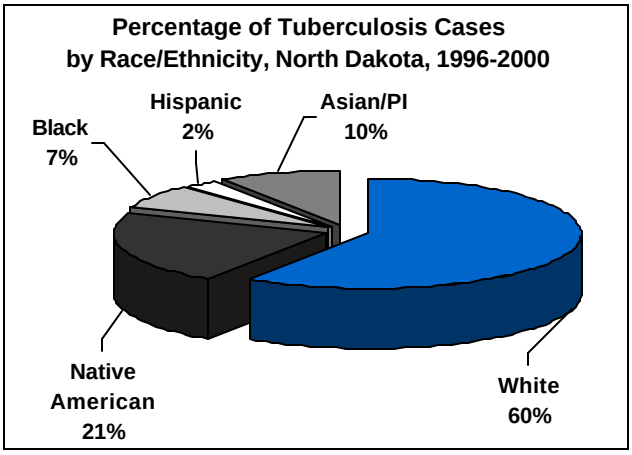
Table 1

Race	1990	2000	% Change
White	604,142	593,181	-1.8%
Native American/ Alaska Native	25,917	31,329	+20.9%
Asian/Pacific Islander	3,462	3,836	+10.8%
Black	3,524	3,916	+11.1%
Hispanic*	4,665	7,786	+66.9%

*Hispanic origin can be of any race
Source: N.D. State Data Center, 2000 Census Data

North Dakota's population in terms of race/ethnicity consists primarily of whites (92.4%), followed by Native Americans (4.9%), Asian/Pacific Islanders and blacks (accounting for 0.6% each). The race/ethnicity of TB cases during the past five years closely reflects the state's population, with the majority of TB cases occurring in whites, followed by Native Americans, Asian/Pacific Islanders and blacks. (Figure 3)

Figure 3



Drug-Resistant TB

With the increase in foreign-born populations entering the United States and North Dakota, the potential exists for drug-resistant TB (DR-TB) to increase. During the past five years, however, only two cases of DR-TB have been reported in North Dakota. Table 2 depicts the DR-TB and multi-drug resistant TB (MDR-TB) during the past five years.

Table 2

DR-TB and MDR-TB, North Dakota, 1996-2000					
	1996	**1997**	**1998**	**1999**	**2000**
Drug Resistance					
Ethambutol	0	0	1	0	0
Isoniazid	1	0	0	0	0
Streptomycin	0	0	0	0	0
Multi-Drug Resistance	0	0	0	0	0

DR-TB and MDR-TB present difficult problems for TB control because of the complicated treatment regimen for the index case and the treatment of latent TB infection in contacts to the index case that must be individualized based on the index cases' medication history and drug susceptibility studies.

Latent TB Infection

Latent TB infection (LTBI) occurs when individuals are infected with *M. tuberculosis* bacteria through direct exposure to active TB disease. People with infection do not have active disease. Clinical findings of LTBI normally include a positive tuberculin skin test (TST), absence of symptoms and a normal chest x-ray.

The number of TB infections reported in North Dakota has increased during the past five years as shown in Table 3. This is due, in part, to an increase in the foreign-born population entering the state. The data in Table 3 includes only reported cases of LTBI who received medication. Many others with LTBI are not deemed candidates for treatment.

Reported Cases of LTBI North Dakota, 1996-2000

1996	1997	1998	1999	2000
248	255	426	450	496*

*Provisional data.

Summary

In North Dakota, TB disease is seen primarily among the elderly, who were infected with TB earlier in life when the disease was more prevalent, and the foreign-born, who come from countries where TB is prevalent today.

It is important to remember that with North Dakota's low incidence of TB disease, the demographics of just one or two new cases can significantly alter the epidemiological profile of the disease and make it difficult to determine actual trends. This is well demonstrated in Figure 2, when, in 1998, the diagnosis of disease in children younger than 10 decreased the mean and median ages of TB cases by about 20 years.

TB control in North Dakota is accomplished through collaborative efforts among health care providers and state and local health departments. Each reported TB case is monitored closely to ensure appropriate treatment of disease, contact investigation with appropriate follow-up for treatment of LTBI and completion of therapy for both LTBI and TB disease.

Did You Know?

Nineteenth century poet, John Keats, died of TB Feb. 23, 1821, at the age of 26. His mother died of TB when Keats was 14 years old.

In 1820, Keats, experiencing ill health, left his homeland of England for Italy (it was thought Italy's warmer air would help cure him). Keats's poem, *"When I have fears that I may cease to be,"* was written during this time and is an expression of Keats's melancholy due to his deteriorating health.

The History of San Haven: North Dakota's TB Sanatorium

Adapted from a manuscript written by Scott Gillies Wagar of Bottineau, N.D.

The Origins of San Haven

At the beginning of the 20th century, North Dakota experienced low rates of TB. Dr. H.H. Healy of the North Dakota State Board of Health reported in the *Biennial Report of the State Board of Health to the Governor of North Dakota for the Years of 1901 and 1902* that, "After careful inquiry, I believe that the state is remarkably free from TB." Two years later, the disease would begin to ravage North Dakota.

By 1908, one of every 10 deaths, excluding stillbirths and those who died from violence, was due to TB. The disease was a cause for concern, and it was felt that the primary solution to the problem was to build a TB sanatorium.

In January of 1909, an anti-TB group, led by Dr. James Grassick and Dr. Fannie Dunn-Quain, began lobbying for a TB sanatorium in North Dakota.

Dr. Grassick, appointed to the position of State Superintendent for Public Health by Governor John Burke in 1906, was a strong advocate for the control of TB in North Dakota. In addition to lobbying for the sanatorium, Grassick established a traveling health clinic in which he and a nurse traveled across the state diagnosing people with TB and educating the public about the disease. Grassick also founded Camp Grassick, a camp for underprivileged children who were more susceptible to TB because of their living conditions at home. Dunn-Quain, (married to Eric Quain, founder of Quain and Ramstad Clinic in Bismarck) also was an advocate in the fight against TB in North Dakota. In addition to lobbying for the sanatorium, she devoted her time to TB patients and educated the people of North Dakota about the disease.

Grassick and Dunn-Quain's lobbying efforts paid off on Jan. 20, 1909, on the 16th legislative day of the Eleventh Session of the North Dakota State Legislative Assembly. On this day, the legislature passed Senate Bill No. 99, a bill for "an act to provide for the location, erection, organization and management of a state sanatorium for persons afflicted with TB and making appropriation for the purchase of lands and the construction of the necessary building and maintenance of the sanatorium."

With $10,000, Grassick and Dunn-Quain (now the governing board members of the Anti-Tuberculosis Association of North Dakota) went to work to find the best location for the state's TB sanatorium. They chose a site on the southeast side of the Turtle Mountains, located in the north-central part of North Dakota. Climatic conditions were important in treating TB, and they felt that this site was perfect because of the altitude and low moisture rate in the area. Furthermore, the location was protected to the north and west by hills and trees, offered fresh water with lakes and springs and the ground had very fertile soil. The location at San Haven also allowed for an additional 100 acres of land through a gift

to the state. The site was chosen and secured by purchase and gift for $4,052.25. On March 3, 1911, during the Twelfth Legislative Assembly, the legislature appropriated funding for "the establishment and government of a state TB sanatorium." The legislature appropriated $25,000 for the Administration Building, $3,000 for the erection of cottages, $5,000 for maintenance, $1,000 for equipment, $1,000 for livestock and poultry and $500 to build a barn. The bill also required Governor Burke to appoint a Board of Trustees.

In November 1912, the North Dakota Tuberculosis Sanatorium received its first patient.

A Patient's San Haven Experience

Anyone who was a resident of North Dakota could be treated at San Haven. If the patient did not have the means to pay, his or her county of residence would pay. Counties paid $1.50/day or $5/week for a patient's treatment at San Haven.

When admitted to San Haven, the patient would immediately be placed in an isolated room to rest. The patient then would be seen by the attending physician to make sure he or she had TB and not some other lung ailment.

The physician collected two 24-hour sputums and conducted an assessment utilizing the only tools available at the time – a spirometer, a stethoscope and a thermometer. (With advanced technology in the 20th century, chest x-rays, fluoroscopes and bronchoscopes improved diagnostic capabilities.)

Once a TB diagnosis was made, the patient's care consisted of bed rest, fresh air and a well-balanced diet. These treatments would become the primary treatments for TB during the entire sanatorium era. At San Haven, patients would spend almost all their time outside receiving " fresh air treatment" and "heliotherapy" (sun treatments), which were thought to help the body's defense mechanism destroy the TB bacilli. When patients were inside, windows were always open to allow fresh air into the rooms. These treatments were especially difficult for the patients in the winter months.

Besides rest and fresh air, the patient's diet was very important because, due to the disease, patients would likely be underweight upon admission. Eating and gaining weight improved their chances of becoming better.

A patient, depending upon how bad his or her disease was, could expect to be in bed for one to four years.

Some other treatment mechanisms utilized at San Haven were:

- Tuberculin treatments – tuberculin injected as a vaccine
- Artificial pneumothorax – use of a needle to inject air into the pleural space. This causes the infected lung to collapse to allow the lung to rest and to reduce the patient's cough and sputum. The procedure often was repeated several times because the lungs would slowly regenerate.

Patients at San Haven suffered from being lonesome and bored. Some would become so homesick and tired of lying in bed that they would leave against their physician's orders. To solve the problem, administration began to allow visiting privileges. They also developed an occupational therapy department for the patients to make crafts. Each patient had a radio with a headset that allowed him or her to listen to the radio. The sanatorium also

created a library which gave the patients the opportunity to read. Movies were shown and church services were provided on a weekly basis. Ambulatory patients could work for a few short hours a day in different departments at San Haven, such as in the greenhouse, on the grounds with the gardeners, in the barns or in the administration office. Also, the San Haven staff provided educational programs regarding TB during free time periods. During holidays, the staff decorated each floor and provided special food and entertainment.

The Beginning of the End

As San Haven continued to treat patients on a daily basis, researchers throughout the world were trying to find a better cure for TB. A major breakthrough occurred in the 1940s when antibiotics were discovered.

On July 1, 1949, San Haven began to use antibiotics as a treatment at the institution. Within the next decade, the death rate from TB dropped by 88 percent.

By 1958, the number of patients being treated at San Haven was almost non-existent. At the same time, the State School at Grafton, which housed individuals who were mentally disabled, was overcrowded. That year, it was decided that Grafton would begin to move some of its patients to San Haven. However, a small portion of the San Haven facility was reserved for TB patients.

In March 1973, the last TB patient was discharged from San Haven, and on July 1, 1973, the North Dakota TB Sanatorium officially closed its doors. On that same day, the administrative power was turned over to the State School of Grafton, and San Haven became an institution for the mentally disabled.

Did You Know?

Sanatorium comes from the Latin word, sanare, which means "to heal."

The Elimination of TB in the United States

The Institute of Medicine recently released a report on the status of TB elimination in the United States. The Centers for Disease Control and Prevention commissioned this study to determine the feasibility of TB elimination as a national goal.

The study determined that TB elimination in the U.S. is feasible, but stated that "to meet this goal, aggressive and decisive actions, beyond what is now in effect, will be required."

The report details recommendations in five key areas that are necessary to achieve the goal of TB elimination:

- Maintain control of TB with declining incidence of disease and changing systems of health care management.
- Accelerate the rate of decline of TB by increasing efforts at targeted tuberculin testing and treatment of LTBI.
- Develop new tools, including diagnostic tests for LTBI, new treatments, and an effective vaccine.
- Increase involvement of the United States in global TB control.
- Mobilize and sustain public support and commitment for the elimination of TB.

Table 1. Candidates for Treatment of Latent Tuberculosis Infection (LTBI)

Category of Person Tested	Tuberculin skin test (TST) result (induration)			
	< 5 mm	≥ 5 mm	≥ 10 mm	≥ 15 mm
Child < 5 years of age and **recent close contact***	Treat	Treat	Treat	Treat
HIV-infected and **recent close contact***	Treat	Treat	Treat	Treat
Immunosuppressed **and recent close contact***	Treat	Treat	Treat	Treat
Recent contact of infectious TB case	Do Not Treat	Treat	Treat	Treat
HIV-infected	Do Not Treat	Treat	Treat	Treat
Immunosuppressed or organ transplant recipient	Do Not Treat	Treat	Treat	Treat
Stable fibrotic changes on chest x-ray (inactive TB)	Do Not Treat	Treat	Treat	Treat
Foreign-born from (or extensive travel to) high-prevalence country †	Do Not Treat	Do Not Treat	Treat	Treat
Injection drug user	Do Not Treat	Do Not Treat	Treat	Treat
Resident/employee of high-risk congregate setting or health care worker ?	Do Not Treat	Do Not Treat	Treat	Treat
Mycobacteria lab personnel ?	Do Not Treat	Do Not Treat	Treat	Treat
High-risk clinical conditions‡	Do Not Treat	Do Not Treat	Treat	Treat
Child < 4 years of age	Do Not Treat	Do Not Treat	Treat	Treat
Child or adolescent exposed to high-risk adults	Do Not Treat	Do Not Treat	Treat	Treat
No risk factors (TST discouraged)	Do Not Treat	Do Not Treat	Do Not Treat	Treat

Pregnancy: Candidates for therapy per criteria in table should be treated during pregnancy if either HIV-infected or recently infected.

* Recent contacts who initially are TST-negative should have TST repeated 12 weeks after last exposure to TB case. Treatment can be discontinued after negative second TST in children.

† Persons who immigrated within the past five years are highest priority for treatment; consider treatment for all persons from high prevalence counties regardless of length of time since arrival in the United States. BCG vaccination is not a contraindication for TST; disregard BCG history when interpreting TST result.

? In instances of repeated testing (other than contacts), an increase in TST result of ≥ 10 mm within two years is considered a TST conversion indicative of recent infection.

‡ Substance abuse, diabetes mellitus, silicosis, cancer of the head or neck, hematologic or reticuloendothelial disease such as Hodgkin's disease or leukemia, end stage renal disease, intestinal bypass or gastrectomy, chronic malabsorption syndromes, low body weight (i.e., 10 percent or more below ideal for the given population).

Table 2. Evaluation and Monitoring During Treatment of Latent Tuberculosis Infection (LTBI)

All patients should have the following:

- Initial pre-treatment clinical evaluation to rule out active TB disease and to assess for likelihood of adverse effects of therapy. Routine monthly liver functions tests (LFTs) generally are not indicated.
- Follow-up evaluation at least monthly if receiving INH or RIF alone; at two, four, and eight weeks if receiving RIF and PZA. Include careful questioning and a brief physical examination to assess for evidence of hepatitis, other side effects and symptoms of active TB disease.
- Education about adverse effects that can be associated with treatment of LTBI. Advise patient to stop treatment and promptly seek medical evaluation if these occur.
- If adverse effects occur, evaluate promptly and change treatment as indicated.

Indications for baseline LFTs, including serum bilirubin and either AST (SGOT) or ALT (SGPT):

- Foreign-born from areas where viral hepatitis is endemic and for whom compete hepatitis serology results are unknown
- HIV infection
- Pregnancy or ≤ 3 months postpartum
- History or initial evaluation indicative of hepatitis or cirrhosis
- Regular alcohol use

Indications for monthly LFTs, including serum bilirubin and either AST (SGOT) or ALT (SGPT):

- Abnormal baseline LFT
- Chronic liver disease
- Regular alcohol use

Medication should be withheld and patient evaluated promptly if:

- Transaminase levels >3 times upper limit of normal in persons with symptoms of hepatitis
- Transaminase levels >5 times upper limit of normal in asymptomatic persons

Table 3. Recommended Regimens for Treatment of Latent Tuberculosis Infection (LTBI) in HIV-Negative* Persons

Drug	Interval and Duration	Oral Dosage (maximum)	Criteria for Completion	Comments
INH	Daily for 9 mos.	Adult: 5 mg/kg (300 mg) Child: 10-20 mg/kg (300 mg)	270 doses within 12 mos.	INH daily for 9 months is the preferred regimen for all persons. INH daily or twice-weekly for 9 months are the **only recommended regimens for children** (unless exposed to INH-resistant TB).
	Twice-weekly by DOT for 9 mos.	Adult: 15 mg/kg (900 mg) Child: 20-40 mg/kg (900 mg)	76 doses within 12 mos.	DOT must be used with twice-weekly dosing.
INH	Daily for 6 mos.	Adult: 5 mg/kg (300 mg)	180 doses within 9 mos.	Use **ONLY** if preferred regimens not feasible.
	Twice-weekly by DOT for 6 mos.	Adult: 15 mg/kg (900 mg)	52 doses within 9 mos.	DOT must be used with twice-weekly dosing.
RIF Plus PZA	Daily for 2 mos.	RIF Adult: 10 mg/kg (600 mg) PZA Adult: 15-20 mg/kg (2000 mg)	60 doses within 3 mos.	Use **ONLY** if preferred regimens not feasible. Recommended for persons exposed to INH-resistant, RIF-susceptible TB.
	Twice-weekly by DOT for 2-3 mos.	RIF Adult: 10 mg/kg (600 mg) PZA Adult: 50 mg/kg (4000 mg)	16 doses with 3 mos. or 26 doses within 4 mos.	Use **ONLY** if preferred regimens not feasible. DOT use be used with twice-weekly dosing.
RIF	Daily for 4 mos.	Adult: 10 mg/kg (600 mg) Child: 10-20 mg/kg (600 mg)	120 doses within 6 mos.	Use **ONLY** if preferred regimens not feasible. For persons who cannot tolerate PZA. For persons (including children) exposed to INH-resistant, RIF-susceptible TB and who cannot tolerate PZA

Abbreviations: INH = isoniazid, RIF = rifampin, PZA = pyrazinamide, DOT = directly observed therapy, mos. = months

Pregnancy: INH regimens are preferred for pregnant women because it is not known whether PZA will cause teratogenic effects to the fetus.

MDR-TB exposure: For persons exposed to INH and RIF (multi-drug) resistant TB, PZA and either ethambutol or quinolone for 6 to12 months are recommended (consult expert).

*Recommended regimens for HIV-infected person are similar to those in Table 1, with the exception that both INH daily for 9 months and RIF/PZA daily for 2 months are recommended regimes. Consult an expert when treating LTBI in HIV-infected person.

Recommendations for Targeted TB Screening and Treatment of LTBI

In June 2000, the CDC published new national guidelines for targeted tuberculin testing and treatment of LTBI. These updated recommendations include several significant changes from previous national guidelines published in 1994. See Tables 1, 2 and 3 on pages 7 and 8, for more information.

- Tuberculin skin tests (TST) should be targeted to people at high-risk for TB; screening of low-risk people is discouraged. The decision to administer a TST should be a decision to treat LTBI if the person has a positive TST result. Tuberculin skin testing is discouraged unless a plan has been developed to ensure the patient's adherence to prescribed therapy for LTBI.

- Criteria used to define a positive TST result have changed slightly. An induration of greater than or equal to 5 mm now is considered positive for organ transplant recipients and certain immunosuppressed people, in addition to groups previously included in this category. Also, a TST conversion is defined as an increase of greater than or equal to 10 mm of induration within a two-year period.

- Several new alternative drug regimens are available for treatment of LTBI; the preferred regimen for HIV-negative people is nine months of daily isoniazid. Some of the shorter alternative regimens (e.g., two months of rifampin and pyrazinamide) may be appropriate in certain circumstances, such as treatment of jail inmates for whom longer follow-up may not be feasible.

- Recommendations for evaluating people prior to initiating treatment of LTBI and for monitoring during treatment have changed, with fewer indications for routine laboratory monitoring and increased emphasis on monthly monitoring for clinical symptoms of adverse effects. Routine laboratory monitoring is no longer recommended; laboratory testing should be done only for people at risk for adverse effects or who develop adverse effects during treatment.

- The previous recommendation to treat people age 35 or older only if they are at high-risk for progressing to TB disease has been discontinued; candidates for treatment of LTBI should be considered for therapy regardless of age. All candidates for treatment of LTBI should be evaluated carefully for the likelihood of adverse effects of treatment.

TB Resource

Core Curriculum on TB, 2000 Edition

This document, produced by the CDC, is a comprehensive, quick-reference for health care providers regarding screening and treatment for LTBI and TB disease.

To obtain a free copy of the *Core Curriculum on TB, 2000 Edition*, visit the North Dakota Department of Health Tuberculosis Control and Elimination Program website at www.health.state.nd.us/ndhd/prevent/disease/tb or call the North Dakota TB Control and Elimination Program at 1.800.472.2180 or 701.328.2378.

TB Resource

North Dakota Department of Health Tuberculosis Website

Visit the North Dakota Department of Health Tuberculosis Control and Elimination Program website at www.health.state.nd.us/ndhd/prevent/disease/tb

This website includes:

- Information relative to local and national TB-related workshops, conferences and meetings.
- Internet links to reliable sources of TB information (i.e., CDC, New Jersey TB Center, etc.).
- State-specific TB data and publications.
- Contact information for local TB controllers.

Nucleic Acid Amplification Tests for Tuberculosis

Reprinted from MMWR July 7, 2000/Vol. 49; No. 26

On September 30, 1999, the Food and Drug Administration (FDA) approved a reformulated Amplified Mycobacterium Tuberculosis Direct Test (MTD) (Gen-Probe®, San Diego, California) for detection of *Mycobacterium tuberculosis* in acid-fast bacilli (AFB) smear-positive and smear-negative respiratory specimens from patients suspected of having TB. MTD and one other nucleic acid amplification (NAA) test, the Amplicor® *Mycobacterium Tuberculosis* Test (Amplicor) (Roche® Diagnostic Systems, Inc., Branchburg, New Jersey), previously had been approved for the direct detection of *M. tuberculosis* in respiratory specimens that have positive AFB smears. This notice updates the original summary published in 1996 and provides suggestions for using and interpreting NAA test results for managing patients suspected of having TB.

Based on available information, the following algorithm is a reasonable approach to NAA testing of respiratory specimens from patients with signs or symptoms of active pulmonary TB for whom a presumed diagnosis has not been established.

Algorithm

1. Collect sputum specimens on 3 different days for AFB smear and mycobacterial culture.
2. Perform NAA test on the first sputum specimen collected, the first smear-positive sputum specimen, and additional sputum specimens as indicated below:

   A. If the first sputum specimen is smear-positive and NAA-positive, the patient can be presumed to have TB without additional NAA testing. However, unless concern exists about the presence non-tuberculosis mycobacteria (NTM), the NAA test adds little to the diagnostic work-up.

   B. If the first sputum is smear-positive and NAA-negative, a test for inhibitors should be done. The inhibitor test can be done as an option with Amplicor. To test for inhibitors of MTD, spike an aliquot of the lysated sputum sample with lysed *M. tuberculosis* (approximately 10 organisms per reaction, or an equivalent amount of *M. tuberculosis* rRNA) and repeat the test starting with amplification.

1. If inhibitors are not detected, additional specimens (not to exceed a total of 3) should be tested. The patient can be presumed to have NTM if a second sputum specimen is smear-positive, NAA-negative, and has no inhibitors detected.

2. If inhibitors are detected, the NAA test is of no diagnostic help. Additional specimens (not to exceed a total of 3) can be tested with NAA.

C. If sputum is smear-negative and MTD-positive, additional specimens (not to exceed three) should be tested with MTD. The patient can be presumed to have TB is a subsequent specimen is MTD-positive.

D. If sputum is smear-negative and MTD-negative, an additional specimen should be tested with MTD. The patient can be presumed not to be infectious if all smear and MTD results are negative. The clinician must rely on clinical judgement in decisions regarding the need for antituberculous therapy and further diagnostic work-up because negative NAA results do not exclude the possibility of active pulmonary TB.

3. If the indicated repeat NAA testing fails to verify initial NAA test results, the clinician must rely on clinical judgment in decisions regarding the need for antituberculous therapy, further diagnostic work-up, and isolation.

4. Ultimately, the patient's response to therapy and culture results are used to confirm or refute a diagnosis of TB.

Cautions

NAA tests can enhance diagnostic certainty, but they do not replace AFB smear or mycobacterial culture, and they do not replace clinical judgment. Clinicians should interpret these tests based on the clinical situation, and laboratories should perform NAA testing only at the request of the physician and only on selected specimens. Laboratorians should not reserve material from clinical specimens for NAA testing if this compromises the ability to perform the other established tests that have better-defined diagnostic utility and implications. Specificity of NAA tests varies between laboratories as a result of unrecognized procedural differences and differences in cross-contamination rates. Information is limited regarding NAA test performance for nonrespiratory specimens, or specimens from treated patients. NAA tests often remain positive after cultures become negative during therapy and can remain positive even after completion of therapy.

Did You Know?

Oscar winner Jessica Tandy, *Driving Miss Daisy*, was forced to quit school at age 11 because she was diagnosed with TB. Tandy, however, did not die from the disease, but lived until 1994 when she succumbed to ovarian cancer at age 85.

The NDDoH, Division of Microbiology, Offers New Test: Amplified *Mycobacterium tuberculosis* Direct (MTD) Test

Advantages of Amplified MTD:

- Provides rapid identification and initiation of treatment for patients with *M. tuberculosis*
- Improves patient management by providing test results in hours rather than weeks.
- Optimizes resources by minimizing unnecessary treatment and isolation of patients who do not have TB
- Allows rapid initiation of appropriate contact tracing

Laboratory Considerations:

- *M. tuberculosis* detected directly from concentrated respiratory specimens
- FDA-approved nucleic acid amplifications assay for testing both smear positive and smear negative specimens
- Accurate results available in 31/2 hours
- Testing scheduled two days each week

Amplified MTD testing will be provided only for specimens from patients who show signs and symptoms of active tuberculosis.

Amplified MTD does not replace acid fast bacilli (AFB) smear and culture. Culture still must be performed due to the need for drug susceptibilities and identification of mycobacteria other than tuberculosis. A minimum of three specimens should continue to be submitted for culture.

The Division of Microbiology (or Public Health Lab [PHL]) will continue to provide AFB smear and culture testing at no charge; however, a laboratory fee of $60 per specimen will be charged for amplified MTD testing through a *Contract for Laboratory Services*.

For additional information or to set-up a contract for MTD testing, call the Division of Microbiology at 701.328.5262.

MTD Test Performance Using Patient Diagnosis as the Endpoint

Smear-Positive Patients	
Sensitivity	96.9%
Specificity	100.0%
PPV	100.0%
NPV	87.5%
Smear-Positive Patients	
Sensitivity	72.0%
Specificity	99.3%
PPV	94.7%
NPV	95.3%

Did You Know?

Emily Bronte, author of *Wuthering Heights*, died of TB in 1848. Her sister Anne, also an author (*Agnes Grey*), died of TB the next year.

Model TB Centers

Model TB centers were established in response to the resurgence of TB in the United States. These centers are federally funded and were developed to decrease morbidity through diagnostic, treatment and prevention programs; to create interaction among clinical and research scientists with a prime interest in TB; to develop and apply diagnostic, therapeutic, behavioral, preventive and educational modalities for TB; and to provide nationally recognized training to increase the skills related to TB for all health-related professionals. Information about all three TB centers can be obtained via their internet sites as listed below. In addition, two centers operate phone lines to provide expert consultation to health care providers about TB treatment and control.

New Jersey Model TB Center
Phone: 1.800.4TB.DOCS (1.800.482.3627)
Website: **www.umdnj.edu/~ntbcweb/**

Francis J. Curry National TB Center
Phone: 415.502.4700
Website: **www.nationaltbcenter.edu/**

Charles P. Felton National TB Center
Website: **www.harlemtbcenter.org/**

North Dakota Department of Health
Division of Microbiology

The North Dakota Department of Health, Division of Microbiology (or Public Health Laboratory [PHL]) is prepared to assist in the early detection of TB by reducing laboratory turnaround time for reporting positive smear, culture, identification and susceptibility results. The American Thoracic Society recommends using a laboratory such as the PHL, which examines a minimum of 20 mycobacteriology specimens per week to remain proficient. It is important to utilize a full-service reference laboratory that is both timely and accurate.

Services Available Through North Dakota PHL

- Results of acid-fast stains reported within 24 hours of receipt. Service available Monday through Friday.
- Rapid detection of *M. tuberculosis* through amplified MTD testing of smear positive and smear negative respiratory specimens.
- Detection of mycobacteria within two weeks of specimen receipt using the BACTEC 460, a liquid medium automated procedure.
- Identification of *M. tuberculosis* and *M. avium* complex using the Accuprobe completed within one day once the organism is growing in culture. (Direct DNA amplification testing for smear-positive specimens is being investigated for possible implementation.)
- Susceptibility testing of new *M. tuberculosis* isolates to primary drugs. On average, results are available within three to four weeks of specimen receipt.

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References cited in this report are available upon request.

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